CURTIS B. STORLIE

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EDUCATION

- **Colorado State University**, Fort Collins, CO
  - PhD Statistics, December 2005
  - Advisers: Thomas Lee and Jan Hannig
- **Arizona State University**, Tempe, AZ
  - MS Statistics, May 2000
- **Saint Olaf College**, Northfield, MN
  - BA Mathematics, May 1997

RESEARCH INTERESTS

- Nonparametric regression.
- Cyber security.
- Analysis of complex computer models.
- High performance computing reliability.

REFEREED PUBLICATIONS (568 citations, Google Scholar 6/04/12)

1. S Pakin, CB Storlie, M Lang, RE Fields III, EE Romero, C Idler, S Michalak, H Greenberg, J Loncaric, R heinheimer, G Grider, J Wendelberger (2012). Power Usage of Production Supercomputers and Production Workloads. *The International Conference for High Performance Computing, Networking, Storage, and Analysis* (in review).
2. CB Storlie, M Fugate, D Higdon, A Huzurbazar, E Francois, and D McHugh (2012). Methods for Characterizing and Comparing Shock Wave Curves. *Technometrics* (in review).
3. CB Storlie, S Vander Wiel, D Quist, B Anderson, C Hash, N Brown (2012). Stochastic Identification and Clustering of Malware with Dynamic Traces. *Annals of Applied Statistics* (in review).
4. CB Storlie, BJ Reich, JC Helton, LP Swiler and CJ Sallaberry (2012). Analysis of Computationally Demanding Models with Continuous and Categorical Inputs. *Reliability Engineering and System Safety* (in review).
5. B Anderson, D Quist, J Neil, CB Storlie, N Brown, and T Lane (2012). Integrating Multiple Data Sources for Improved Malware Classification. *USENIX Security* (in review).
6. A Nosedal, CB Storlie (2012). Locally Adaptive Smoothing Splines via the Locally Adaptive

COmponent Selection and Shrinkage Operator (LACOSSO). *Journal of Computational and Graphical Statistics* (in review).

7. J Neil, CB Storlie, C Hash, A Brugh, and M Fisk (2012). Scan Statistics for the Online Identification of Locally Anomalous Subgraphs. *Technometrics* (in review).
8. CB Storlie, SE Michalak, HM Quinn, AJ DuBois, SA Wender, DH DuBois (2012). A Bayesian Survival Analysis of Neutron Induced Errors in High Performance Computing Hardware. *Journal of the American Statistical Association* (in review).
9. N Sumee, R Tarefder, and CB Storlie (2012), A Study of MEPDG Sensitivity Using Parametric Statistical Techniques. *Journal of Structural Engineering* (in review).
10. SE Michalak, AJ DuBois, CB Storlie, HM Quinn, WN Rust, DH DuBois, DG Modl, A Manuzzato, and SP Blanchard (2012). Assessment of the Impact of Cosmic-Ray-Induced Neutrons on Hardware from the Roadrunner Supercomputer. *IEEE Transactions on Device and Materials Reliability* (in press).
11. A Nosedal, CB Storlie, TCM Lee, and R Christensen (2012). Reproducing Kernel Hilbert Spaces for Penalized Regression: A tutorial. *The American Statistician* (in press).
12. M O'Brien and CB Storlie (2012). An Alternative Bilateral Refitting Model for Zooarchaeological Assemblages. *Journal of Taphonomy* (in press).
13. N Sumee, R Tarefder, and CB Storlie (2012), A study of MEPDG Sensitivity Using Nonparametric Regression Procedures. *Journal of Computing in Civil Engineering* (in review).
14. SE Michalak, AJ DuBois, CB Storlie, HM Quinn, WN Rust, DH DuBois, DG Modl, A Manuzzato, and SP Blanchard (2011). Neutron Beam Testing of High Performance Computing Hardware. *2011 IEEE Radiation Effects Data Workshop (REDW)*, 1-8.
15. CB Storlie, J Hannig, and TCM Lee (2011). Statistical Consistency of the Data Association Problem in Multiple Target Tracking. *Electronic Journal of Statistics* **5**, 1227-1275.
16. BJ Reich, E Kalendra, CB Storlie, HD Bondell, and M Fuentes (2011). Variable selection for Bayesian density estimation: Application to human exposure simulation. *Journal of the Royal Statistical Society C.* **61** (1), 4766.
17. B Anderson, D Quist, J Neil, CB Storlie, and T Lane (2011). Graph-Based Malware Detection Using Dynamic Analysis. *Journal in Computer Virology.* **7** (4), 247-258.
18. H Djidjev, G Sandine, CB Storlie, and S Vander Wiel (2011). Graph Based Statistical Analysis of Network Traffic. *Ninth Workshop on Mining and Learning with Graphs (MLG 2011).*
19. CB Storlie, HD Bondell, BJ Reich, and HH Zhang (2011). Surface Estimation, Variable Selection, and the Nonparametric Oracle Property. *Statistica Sinica* **21** (2), 679-705.
20. CB Storlie, HD Bondell, and BJ Reich (2010). A Locally Adaptive Penalty for Estimation of Functions with Varying Roughness. *Journal of Computational and Graphical Statistics.* **19** (3), 569-589.
21. CB Storlie, LP Swiler, JC Helton, and CJ Sallaberry (2009). Implementation and Evaluation of Nonparametric Regression Procedures for Sensitivity Analysis of Computationally Demanding Models. *Reliability Engineering and System Safety* **94** (11), 1735-1763.

22. BJ Reich, CB Storlie, and HD Bondell (2009). Variable Selection in Bayesian Smoothing Spline ANOVA Models: Application to Deterministic Computer Codes. *Technometrics* **51** (2), 110-120.

23. CB Storlie, TCM Lee, J Hannig, and D Nychka (2009). Tracking of Multiple Merging and Splitting Targets: A Statistical Perspective (with discussion). *Statistica Sinica* **19** (1), 1-52.

24. CB Storlie and JC Helton (2007). Multiple Predictor Smoothing Methods for Sensitivity Analysis: Description of Techniques. *Reliability Engineering and System Safety* **93** (1), 28-54.

25. CB Storlie and JC Helton (2007). Multiple Predictor Smoothing Methods for Sensitivity Analysis: Example Results. *Reliability Engineering and System Safety* **93** (1), 55-77.

26. JC Helton, JD Johnson, WL Oberkampf, and CB Storlie (2007). A Sampling-Based Computational Strategy for the Representation of Epistemic Uncertainty in Model Predictions with Evidence Theory. Special issue of *Computer Methods In Applied Mechanics and Engineering* **196**, 3980-3998.

27. JC Helton, JD Johnson, CJ Sallaberry, and CB Storlie (2006). Survey of Sampling-Based Methods for Uncertainty and Sensitivity Analysis. *Reliability Engineering and System Safety*, **91**, 1175-1209.

28. CB Storlie and JC Helton (2005). Multiple Predictor Smoothing Methods for Sensitivity Analysis. *Winter Simulation Conference 2005*, 231-239.

29. CB Storlie, TCM Lee, D Nychka, B Whichter, C Davis, and J Weiss (2004). Identifying and Tracking Turbulence Structures. *38th Asilomar Conference on Signals, Systems, and Computers*, **2**, 1700 - 1704.

INVITED LECTURES

1. Classification and Clustering of Malware with Dynamic Traces. *2012 Malware Technical Exchange Meeting*, San Diego, CA (2012)

2. Computer Network Hacker Detection via Locally Anomalous Subgraphs. *8th International Purdue Symposium on Statistics*, West Lafayette, IN (2012)

3. Stochastic Identification and Clustering of Malware with Dynamic Traces. *Cyber Engineering Research Institute Seminar*, Albuquerque, NM (2012)

4. Calibration and Prediction using Multiple Computer Models. *2011 INFORMS Annual meeting*, Charlotte, NC (2011).

5. Stochastic Identification of Malware with Dynamic Traces. *2011 Malware Technical Exchange Meeting*, McLean, VA (2011).

6. Functional ANOVA Decomposition and Discrete Inputs in Computer Model Emulation. *SIAM CS&E Meeting*, Reno, NV (2011).

7. Reduction of Model Complexity and the Treatment of Categorical Inputs in Computer Model Emulation. *2010 INFORMS Annual meeting*, Austin, TX (2010).

8. Graph Anomalies in Cyber Communication. *Joint Statistical Meetings*, Vancouver, CA (2010).

9. A Bootstrap Approach to the use of Meta-models for Uncertainty and Sensitivity Analysis.

European Meeting of Statisticians, Toulouse, France (2009).

10. Adaptive Weighting for Flexible Estimation and Variable Selection in Nonparametric Regression Models. *Los Alamos National Laboratory, Center for Nonlinear Studies Seminar*, Los Alamos, NM (2009).
11. An Efficient and Effective Procedure for Sensitivity Analysis of Complex Computer Models, *Sandia National Laboratories, Optimization and Uncertainty Quantification Seminar*, Albuquerque, NM (2009).
12. Tracking of Multiple Merging and Splitting Targets with Application to Convective Systems. *ICSA 2008 Applied Statistics Symposium*, Piscataway, NJ (2008).
13. Surface Estimation, Variable Selection, and the Nonparametric Oracle Property, *Chinese University of Hong Kong*, Hong Kong, China (2008).
14. Confidence Limits for Sensitivity Indices Estimated via Meta-Models, *Joint Research Commission Workshop*, Ispra, Italy (2008).
15. The Adaptive COSSO for Nonparametric Surface Estimation and Model Selection, *Los Alamos National Laboratory, Statistical Sciences (CCS-6) Seminar*, Los Alamos, NM (2007).
16. Reproducing Kernel Hilbert Spaces and Regularization Methods, *Computer Science Department, University of New Mexico*, Albuquerque, NM (2007).
17. Multiple Predictor Smoothing Methods for Sensitivity Analysis, *Winter Simulation Conference*, Orlando, FL (2005).
18. A Sampling-Based Computational Strategy for the Representation of Epistemic Uncertainty in Model Predictions with Evidence Theory, 7^{th} *US National Congress on Computational Mechanics*, Austin, TX (2004).
19. Identifying and Tracking Turbulence Structures. *38th Asilomar Conference on Signals, Systems, and Computers*, Pacific Grove, CA (2004).

FUNDED RESEARCH

1. Co-Investigator, Los Alamos National Laboratory LDRD 20110093DR, "Multi-Perspective Network-Scale Modeling & Detection for Cyber Systems", 2011−2013.
2. Principle Investigator, SURP Grant 22858, "Advances in Sensitivity Analysis for Complex Computer Models", 2007−2009
3. Principle Investigator on Sandia National Laboratories Contract PR 914050, "Sensitivity Analysis Enhancement and Implementation", 2007

PROFESSIONAL EXPERIENCE

- **Research**
  - **Los Alamos National Laboratory**, Los Alamos, NM (April. 2010 – present)
    Technical Staff in the Statistical Sciences Group (CCS-6). Currently working on problems in the areas of cyber security, calibration/uncertainty/sensitivity analysis of complex

computer models, and modeling of radiation induced data corruption.

– **University of New Mexico**, Albuquerque, NM (Jan. 2007 – May 2010)
Assistant Professor in the department of Mathematics and Statistics. Worked on problems in the areas of nonparametric regression and cyber security. Also worked on approaches to sensitivity and uncertainty analysis with collaborators at Sandia National Laboratories.

– **North Carolina State University**, Raleigh, NC (Aug. 2005 – Dec. 2006)
Postdoc at NC State in conjunction with the Statistical and Applied Mathematical Sciences Institute (SAMSI) in Durham, NC. Involved in the National Defense and Homeland Security programs at SAMSI. Investigated methods of anomaly detection for use in syndromic surveillance. Also worked on nonparametric regression and variable selection approaches with faculty at NC State.

– **National Center for Atmospheric Research**, Boulder, CO (May 2003 – June 2005)
Graduate Research Assistant for the Geophysical Statistics Project (GSP). This work was largely related to my PhD thesis. Used stochastic models to perform the tracking of merging and splitting targets, such as storms or vortices. This work is motivated by areas such as climate model improvement and validation, storm forecasting, and turbulence research.

– **Sandia National Laboratories**, Albuquerque, NM (Sep. 1998 – Dec. 1998, May 2002 – Aug. 2002, and May 2007 – Aug. 2007)
Worked on the Waste Isolation Pilot Plant and Yucca Mountain Projects for nuclear waste disposal. Used nonparametric regression approaches to perform sensitivity analysis of uncertain inputs in large computer models. Analysis of this type is essential for validating computer models and allocating resources for further investigation of some of the more important input variables.

- **Teaching**
  – **University of New Mexico**, Albuquerque, NM (Jan. 2007 – present)
  – **North Carolina State University**, Raleigh, NC (Aug. 2005 – Dec. 2006)
  – **Colorado State University**, Fort Collins, CO (Aug. 2000 – May 2003)
  – **Lamson Junior College**, Tempe, AZ (Sep. 1999 – Dec. 1999)
  – **Arizona State University**, Tempe, AZ (Aug. 1997 – May 1998)

  Courses Taught
  Analysis of Computational Models, Stochastic Processes, Multivariate Analysis, Regression Analysis, Nonparametric Regression, Introduction to Statistics for Engineers, Experimental Statistics for Biological Sciences, Introduction to Statistical Methods, and College Algebra.

  Advising
  * Josh Neil, PhD Statistics, graduated spring 2011
  * Alvaro Nosedal-Sanchez, PhD Statistics, graduated fall 2010
  * Nasrin Sumee, MS Civil Engineering, graduated fall 2010

* Bea Yu, MS Statistics, graduated summer 2010
* Armida Carbajal, MS Statistics, graduated summer 2010

- **Consulting**
  - **Arizona State University**, Tempe, AZ (Aug 1999 – May 2000)
    Worked as a Statistical Consultant in the IT Research Support Center. Helped faculty and graduate students from other departments with design of experiments and surveys as well as data analysis. Projects included sample size determination, analysis of covariance, mixed models analysis, categorical data analysis, generalized linear models, and permutation tests.

- **Industry**
  - **3M**, Saint Paul, MN (Summers of 1998, 1999, 2000, 2001)
    Worked as an intern on Quality Control and Process Optimization for various products, including Bump-ons, tapes and films, and personal care products. Responsible for measurement systems analysis and designing experiments to achieve process optimization. Implementing process control using partial least squares and multivariate control charting.

SERVICE

- Associate Editor for Special CoDA issue of Technometrics 2012
- Manuscript Refereeing
  - Journal of the American Statistical Association, Annals of Applied Statistics, Biometrics, Statistica Sinica, Journal of Computational and Graphical Statistics, The American Statistician, Reliability Engineering and Systems Safety, Journal of Probability and Statistical Science, Ecotoxicology and Environmental Safety, Journal of Agricultural, Biological, and Environmental Statistics.
- Representative for the Albuquerque Chapter of the American Statistical Association (ACASA), 2007-2010.
- Co-organizer and Mentor for SAMSI Undergraduate Workshop 2006. Helped to organize the presentations and activities and gave a lecture on the use of statistical techniques to aid in mathematical modeling of physical processes.
- Member of the ASA.
- Committee Membership
  - Statistics Graduate Committee at UNM, 2007-2009.
  - Search Committee at UNM for Assistant Professor in Statistics, spring 2009.
  - Search Committee at UNM for Assistant Professor in Statistics, spring 2007.
  - Search Committee at UNM for Open Rank Statistics position, spring 2007.
- Designed and analyzed a survey for Hope Community Church in 2007 with respect to optimizing attendance and volunteering.

REFERENCES

- Thomas Lee, PhD Statistics, Chinese University of Hong Kong, (970)310-8333, thomas.cm.lee@gmail.com
- Jan Hannig, PhD Statistics, University of North Carolina at Chapel Hill, (970)310-0991, jan.hannig@gmail.com
- Jon Helton, PhD Mathematics, Sandia National Laboratories, (505)284-4808, jchelto@sandia.gov
- Douglas Nychka, PhD Statistics, National Center for Atmospheric Research, (303)497-1711, nychka@ucar.edu